



Solar System Exploration Division Seminar
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Building 34, Room W150

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The International Terrestrial Reference Frame: current status and future challenges

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The ability to assign accurate time-dependent coordinates to points on the Earth's surface is fundamental for many Earth observation applications. Also important is monitoring these coordinates over time in order to take into account all geophysical changes affecting the Earth's surface. Many areas of science, Earth observation, geo-referencing applications, and society at large, today depend on being able to determine positions to millimeter level precision. Point positions, to be meaningful and fully exploitable, have to be determined and expressed in a well-defined Terrestrial Reference Frame (TRF).

The positions of the thousands of geodetic stations distributed over the Earth's surface can now be determined with a precision at the level of a few millimeters and their variation over time at the level of, or better than, 1 mm/yr in a global geocentric frame. This performance is only possible as a result of the tremendous progress made in improving the hardware of the space geodetic techniques and in the high level algorithms, models, and scientific software packages developed by the analysis centers dealing with the geodetic observations accumulated over the last three decades.

The presentation will focus on the current ITRF results achieved so far and future challenges towards its refinement: improvement by a factor of 10 is needed in order to meet the science requirement of 0.1 mm/yr stability over time for confident tracking of sea level change. A particular emphasis will be given to the current status of the ITRF geodetic infrastructure, technique systematic errors as seen from the ITRF combination results and its future parameterization, taking into account and quantifying all geophysical changes and non-linear motions affecting the Earth's crust.



Zuheir Altamimi is a Research Director at IGN-France. His principal research focuses are space geodesy, theory and realization of terrestrial reference systems. He is head and principle scientist of the International Terrestrial Reference System (ITRS) Product Center of the IERS. He is member of the International Earth Rotation and Reference Systems Service (IERS) Directing Board and of the Governing Board of the International GNSS Service (IGS). His honors include Prix Antoine d'Abbadie (2011) of the French Academy of Sciences and Vening Meinesz Medal of the European Geosciences Union (2013). He received his Ph.D. in space geodesy from Paris Observatory, and his habilitation (2nd doctorate) from Paris University VI.
